

Features & Benefits

- Simple one-part system
- Shaft-hub assemblies can be made with slip fits
- Expensive press fits can be eliminated
- High viscosity for maximum gap filling ability
- Excellent shear strength
- Superior environmental resistance
- Thixotropic viscosity allows easy dispensing

Description

Permabond® HH040 is a single component liquid that cures only when in contact with metal parts and oxygen is excluded. The liquid adhesive fills the “air space” between parts and upon cure unitizes and retains male and female parts. Thus it prevents their movement relative to each other, eliminating wear, erosion, and pitting. HH040 cures to a tough cross-linked plastic that will prevent the corrosion of mated parts and provides excellent environmental and temperature resistance.

Physical Properties of Uncured Adhesive

Chemical composition	Acrylic
Appearance	Green
Viscosity @ 25°C	5,000 mPa.s (cP) Thixotropic
Specific Gravity	1.1
UV fluorescence	Yes

Typical Curing Properties

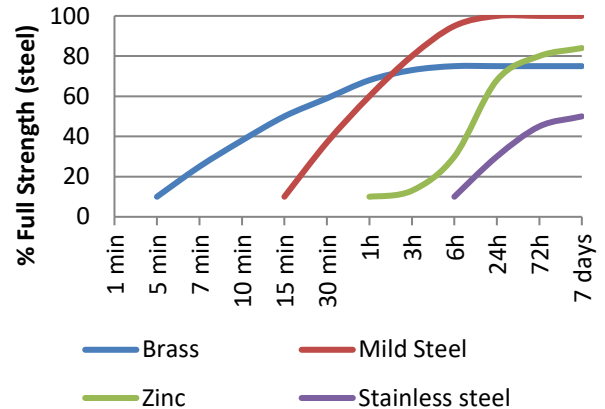
Maximum gap fill	0.25 mm 0.01 in
Maximum thread size	M30 ¾"
Time taken to reach handling strength (M10 steel) @23°C	15 minutes*
Time taken to reach working strength (M10 steel) @23°C	1 hour
Full strength (M10 steel) @23°C	24 hours

*Handling time at 23°C / 73°F. Copper and its alloys will make the adhesive cure more quickly, while oxidised or passivated surfaces (like stainless steel) will reduce cure speed. To reduce curing time, use Permabond activator A905 or ASC10. Alternatively, increasing the curing temperature will reduce curing time.

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Strength Development



*Cure times are typical at 23°C. Copper and its alloys will follow the faster cure while oxidised or passivated surfaces like stainless steel will tend towards the slower curve. Lower temperatures or large gaps will tend to extend the cure time. To reduce the cure time the use of Permabond A905, ASC10, or heat can be considered.

Typical Performance of Cured Adhesive

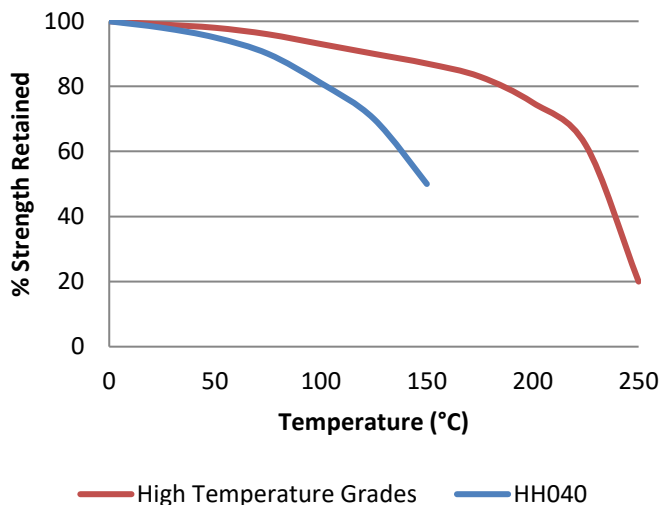
Torque strength (M10 steel ISO10964)	Break 25 N·m 220 in.lb Prevail 37 N·m 330 in.lb
Shear strength (steel collar & pin ISO10123)	14 MPa 2000 psi
Coefficient of thermal expansion	90 x 10 ⁻⁶ mm/mm/°C
Dielectric strength	11 kV/mm
Thermal conductivity	0.2 W/(m.K)

Effect of Anaerobic Retaining Compound on Push-Off Force*

	Clearance (inches)	Finish (micro-inches)	Push-Off force (psi)
Interference fit	-0.0005	6	2100
Slip fit HH040	+0.002	6	2350
Slip fit HH040	+0.002	63	3400

*1/2 inch steel collar & pin.

Hot Strength



"Hot strength" Breakaway strength on M10 Zinc plated bolts according to ISO 10964. Cured at 23°C for 24 hours then conditioned for 30 minutes at testing temperature.

HH040 can withstand higher temperatures for brief periods (such as for paint baking and wave soldering processes) providing the joint is not unduly stressed. The minimum temperature the cured adhesive can be exposed to is -55°C (-65°F) depending on the materials being bonded.

Joint Strength

The amount of bonded area, the bondline thickness and the surface finish of the cylindrical parts determine the strength of a joint.

The bond area and bondline thickness (clearance) depend on the design of the joint. As the gap (clearance) between parts increases, some loss of strength is experienced. Maximum strength is obtained when the diametrical clearance does not exceed 0.005 inches.

Clearance (inches)	% Strength Retained	Surface Finish (micro-inches)*	% Strength Retained
0.0025	93%	8	45%
0.0050	91%	32	57%
0.0075	85%	64	70%
0.0100	62%	70	100%

* Micro-inches = 1×10^{-6} in.

A machine finish will usually yield a surface roughness of 60 to 80 micro-inches that will typically give optimum strength when using HH040.

Surface Preparation

Though the anaerobic adhesives will tolerate a slight degree of surface contamination, best results are obtained on clean, dry and grease free surfaces. The use of a suitable solvent-based cleaner (such as acetone or isopropanol) is recommended. In general, roughened surfaces (~25µm) give higher bond strengths than polished or ground surfaces.

To reduce the curing time, especially on inactive surfaces (such as zinc, aluminium and stainless steel), the use of Permabond A905 or ASC10 can be considered.

Directions for Use

1. On slip fitted assemblies, apply adhesive on the leading edge of the pin and on the inside of the collar.
2. Assemble with twisting action.
3. On press fitting assemblies, apply the adhesive on the pin and collar. Assemble using a press.
4. On shrink fitted assemblies, apply the adhesive to the pin, heat the collar to create enough clearance and assemble.
5. Allow the parts to fixture before disturbing them.

This product is not recommended for use in contact with oxygen, oxygen rich systems and other strong oxidizing materials. This product may adversely affect some thermoplastics and users must check compatibility of the product with such substrates before using.

Storage & Handling

Storage Temperature	5 to 25°C (41 to 77°F)
Users are reminded that all materials, whether innocuous or not, should be handled in accordance with the principles of good industrial hygiene. Full information can be obtained from the Safety Data Sheet.	

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